APPENDIX A
Cable Types

Copper cables are best suited for short local connections, and fiber-optic cables are typically used for medium- and long-distance connections. Both types of cables support 100 megabytes per second (MB/sec) maximum bandwidth. Figures A-1 through A-4 show the cables to use when connecting the various SAN hardware components.

You *must* use copper cables to connect a Dell PowerVault Fibre Channel switch and the Dell PowerVault 650F/651F disk processor enclosure (DPE) or Dell PowerVault 660F storage system, limiting the distance between them to 12 meters (m).

The connection between the server's host bus adapter (HBA) and the PowerVault Fibre Channel switch may be copper or optical. Use optical cables when possible because they provide ground isolation and reduce electromagnetic interference (EMI). You may use copper connections between the server and the PowerVault Fibre Channel switch when the distance is less than 12 m or the components are in the same rack.

The PowerVault Fibre Channel switch includes a straight-through serial cable with DB-9 connections to enable the management of the PowerVault Fibre Channel switch through the serial port on the switch.

The PowerVault 35F multiport bridge includes a serial cable with a DB-9–to–RJ45 connection to enable management of the PowerVault 35F through its serial port.

Figure A-1 shows the cables that can be used between the SAN components when connecting servers, switches, and PowerVault 650F, 651F, and 630F storage systems.
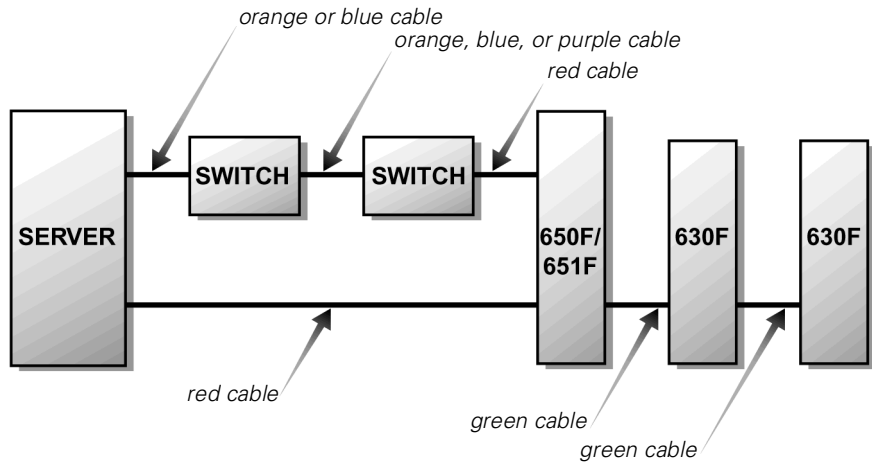
Figure A-1. Valid Cable Connections for PowerVault 650F, 651F, and 630F Storage Systems

Figure A-2 shows the cables that can be used between the SAN components when connecting servers, switches, and PowerVault 660F and 224F storage systems.
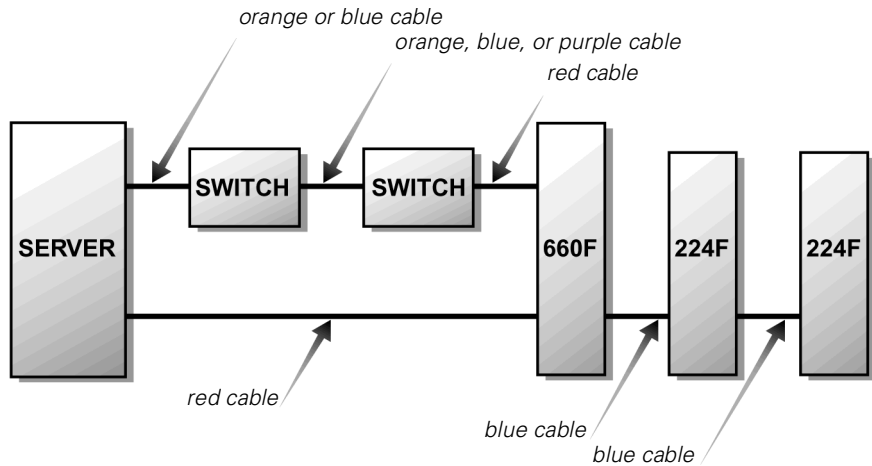

Figure A-2. Valid Cable Connections for PowerVault 660F and 224F Storage Systems

Figure A-3 shows the cables that can be used between the SAN components when connecting servers, switches, and the PowerVault 530F SAN appliance.
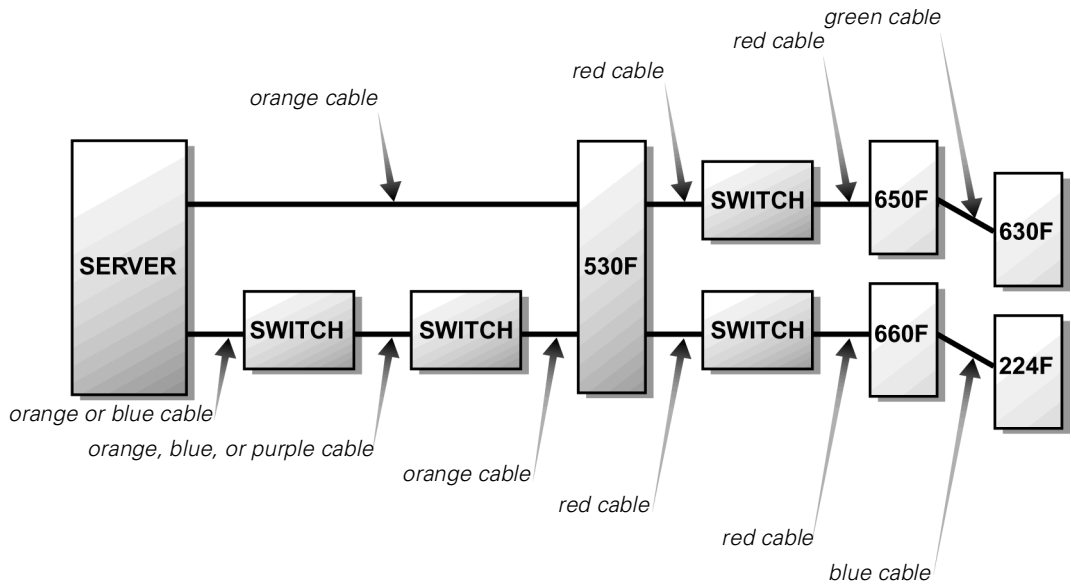

Figure A-3. Valid Cable Connections for PowerVault 530F SAN Appliances

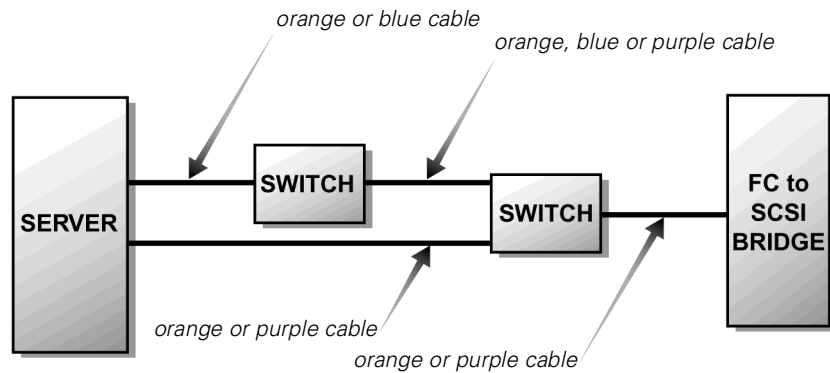Figure A-4 shows the cables that can be used between the SAN components when connecting servers, switches, and bridges.

Figure A-4. Valid Cable Connections for PowerVault Bridges

Table A-1 shows the optional cables and connections available from Dell.

Table A-1. Cable Kits—Switch and Fibre Channel Bridge

Application	Connectors	Cable Type	Cable Length	Color
Switch to HBA or switch to switch	HSSDC[1] to HSSDC	Copper (unequalized)	6 m	Blue
Switch to HBA or switch to switch	HSSDC to HSSDC	Copper (unequalized)	12 m	Blue
Switch to PowerVault 650 and 660F	HSSDC to DB-9	Copper (unequalized)	3 m	Red
Switch to PowerVault 660 and 650F	HSSDC to DB-9	Copper (unequalized)	6 m	Red
Switch to PowerVault 660 and 650F	HSSDC to DB-9	Copper (unequalized)	12 m	Red
PowerVault 660F to PowerVault 224F	HSSDc to HSSDC	Copper (unequalized)	Approx. 1 ft	Blue
PowerVault 224F to PowerVault 224F	HSSDC to HSSDC	Copper (unequalized)	Approx. 1 ft	Blue
PowerVault 650F to 630F	DB-9 to DB-9	Copper (unequalized)	Approx. 6 inches	Green
PowerVault 630F to 630F	DB-9 to DB-9	Copper (unequalized)	Approx. 6 inches	Green
Bridge to switch, switch to HBA, or switch to switch	SC[2] to SC	SW optical 50/125	10 m	Orange
Bridge to switch, switch to HBA, or switch to switch	SC to SC	SW optical 50/125	25 m	Orange
Bridge to switch, switch to HBA, or switch to switch	SC to SC	SW optical 50/125	60 m	Orange
Bridge to switch, switch to HBA, or switch to switch	SC to SC	SW optical 50/125	100 m	Orange

1   *High-speed serial data connector*

2   *Subscriber connector*

Connectors for Copper Fibre Channel Cables

The most widely used connectors for copper Fibre Channel cables are the DB-9 and HSSDC. Dell uses the DB-9 connector, shown in Figure A-5, on PowerVault 650F and 651F DPEs and PowerVault 630F DAEs and on PowerVault 660F and 224 storage systems.
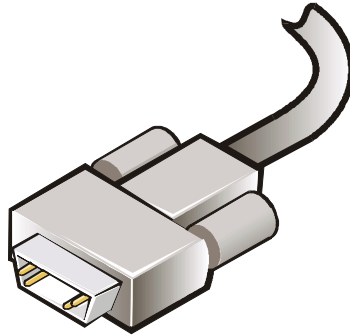

Figure A-5. DB-9 Connector

Dell uses the HSSDC, shown in Figure A-6, on HBAs and on the copper connections to the gigabit interface converters (GBICs) on the PowerVault Fibre Channel switches. In addition to providing a unique interface, the HSSDC provides better impedance control than the DB-9 connector.
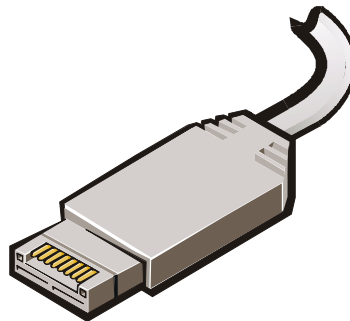

Figure A-6. HSSDC Connector

Optical Connectors

Fibre Channel networks implemented with optical cables use a subscriber connector (SC) such as the one in Figure A-7. There are two types of optical cables: longwave and shortwave. Longwave cables use a 9-millimeter (mm) single-mode (SM) fiber. Shortwave cables use a 50/125-mm or 62.5/125-mm multimode (MM) fiber.

Shortwave and longwave cables are not interchangeable. The GBICs associated with shortwave and longwave cables are also not interchangeable. The GBICs can be differentiated by color. Shortwave GBICs are black and longwave GBICs are teal. The cables should also be labeled.

Although they look the same, the SC cable connectors and associated GBICs used with MM fiber are keyed differently than those used with SM fiber. Other fiber implementations, such as Fiber Distributed Data Interface (FDDI), use different types of optical connectors.
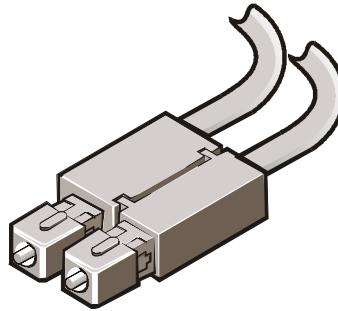

Figure A-7. SC Optical Connector